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Managing Risk

Executive Program Manager's Course

Defense Systems Management College

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Agenda

- Objectives of Risk Management
- Definitions
- Risk Management Process
  - **General Context and Background**
  - **Four Rules for Managing a Crisis**
  - **Implementing Risk Management**
  - **“Goods” and “Others”**
- Methodology
  - **Assessment**
  - **Handling**
  - **Monitoring**
- Risk data collection

Objectives of Risk Management

- Provide insight into what can go wrong
  - **If you don't know about it, you can't prepare for it**
- Increase the likelihood of success
  - **On Cost - Within Budget**
  - **On Schedule - Field your system quickly and support it responsively**
  - **Meet Performance requirements**
- Serve as decision support system for key decision makers
  - **Resource allocation**
  - **Prioritization**
- Track Progress and Document "lessons-learned"

Aldridge's Five Goals*

- "...restore the credibility and effectiveness of the acquisition logistics support process through such things as the proper pricing of programs and the notification to Congress of program schedule risks."
- "...bolster the strength of the industrial base through things like proper profit incentives and attraction of Wall Street investment and quality personnel."
- "...leverage technologies for the long term through greater Science and Technology (S&T) funding."
- "...rationalize weapons programs with the national security strategy."
- "...improve the quality and morale of DoD's acquisition work force."

*Pete Aldridge's comments before the AIAA'S Global Air & Space Conference, 9 May 2001, *DEFENSE DAILY* 10 May 2001

Definition: What is Risk?

- "The potential inability to achieve overall program objectives within defined cost, schedule, and technical constraints and has two components:
  - **(1) the probability/ likelihood of failing to achieve a particular outcome, and**
  - **(2) the consequences/impacts of failing to achieve that outcome."**
    - RISK MANAGEMENT GUIDE FOR DOD ACQUISITION, Fourth Edition DoD, DAU, DSMC, February 2001

- "...an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective".
    - Project Management Institute PMBOK®, 2001 edition

- "**risk** (risk) *n.* [Fr. *risqué* < Ital. *risco*.] **1.** Possibility of suffering harm or loss: DANGER. **2.** A factor, course, or element involving uncertain danger: HAZARD...." **3. a.** The danger of probability of loss to an insurer. **b.** The amount that an insurance company stands to lose. **c.** One considered with respect to the possibility of loss to an insurer <a good *risk*>
    - Webster's II University Dictionary

More Definitions

- Risk Management Is –
  - **A systematic and organized process to efficiently identify, assess, and respond to project risks throughout the life of a project and in the best interest of its objectives**
  - **Risk management is a process that involves everyone**
- Risk Management Is Not –
  - **A Software tool**
  - **A person or a job description**
  - **A meeting or event**
  - **A document that sits on a shelf**
- Risk is – **Uncertain (usually a future event); has an effect or impact.**
- Risk Is Not –
  - **Certain: If an event is sure to happen, it is not a risk (plan for and manage it)**
  - **Historical: If it has already happened, it may be a crisis, but it's not a risk**
- Components of Risk – **Probability and Consequence**
- Life Cycle Application – **Risk management is a formal, iterative process applied throughout the entire system life cycle**

Defining Risk

- What might or might not happen?
  - **Nouns aren't risks… look for a verb.**
- How likely? What's the impact?
- When? How will you know it occurred?
- Is it internal or external?
- If it's sure to happen…
  - **…It's not a risk.**
- If it's already happened…
  - **…It may be a crisis, but it's not a risk.**

Crisis Management

- What?
- So What?
- Now What?

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Crisis Management

Four things must be in place ahead of time :

- **Rapid communication capability** with a clear path for passing critical information.
- **Established points of contact** in key support organizations, including those that don't normally support the program (contract vehicles?).
- **Communication skills training** for key program personnel.
- **Established credibility** with upper management, public affairs, trade press and other news media.

When a crisis comes, be ready to lead - don't be forced to react

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How do you Manage Risk?

- Define
- Identify
- Analyze
- Mitigate

- Plan
- Assess
- Handle
- Monitor
- Document

- Plan
- Identify
- Assess
- Quantify
- Response Plans
- Monitor/Control

Use a process that works for YOU!

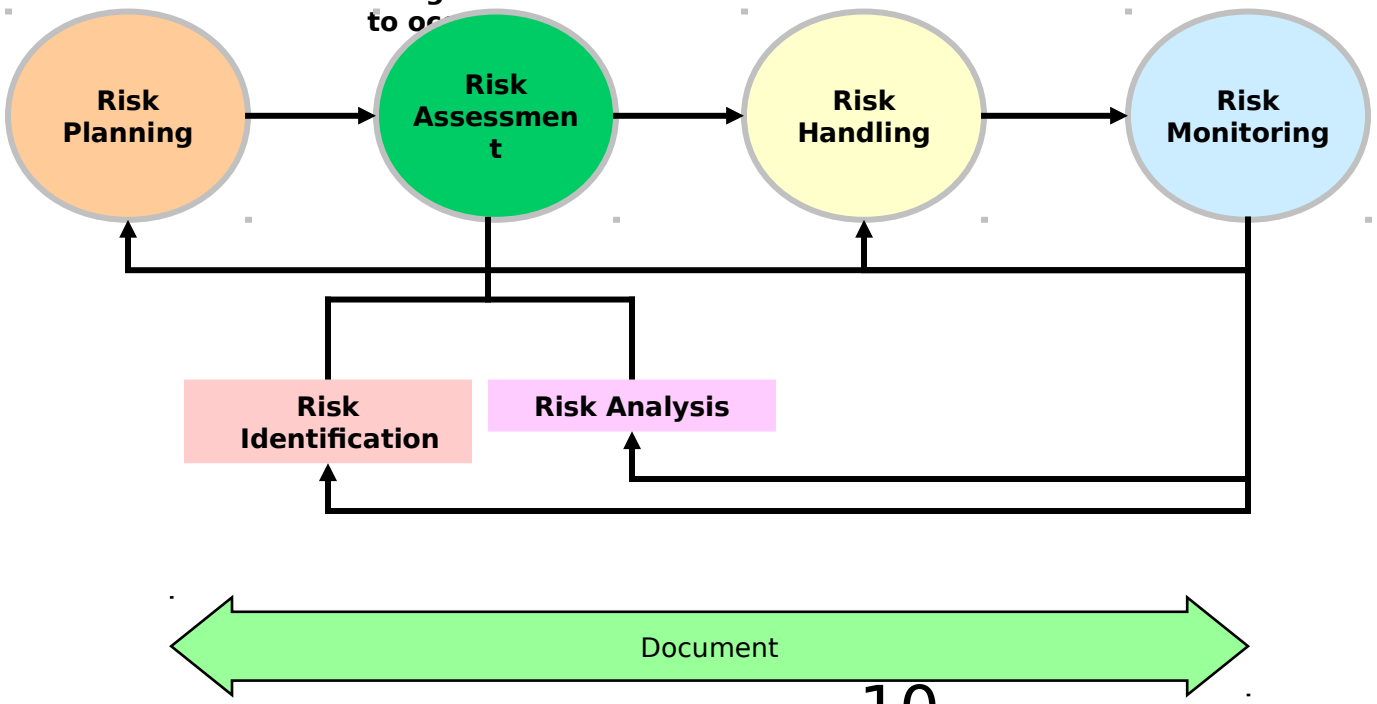
Risk Management Process

- Develop and Implement Risk Management Process
- Develop Automated Tool
- Document
- Train Project Personnel

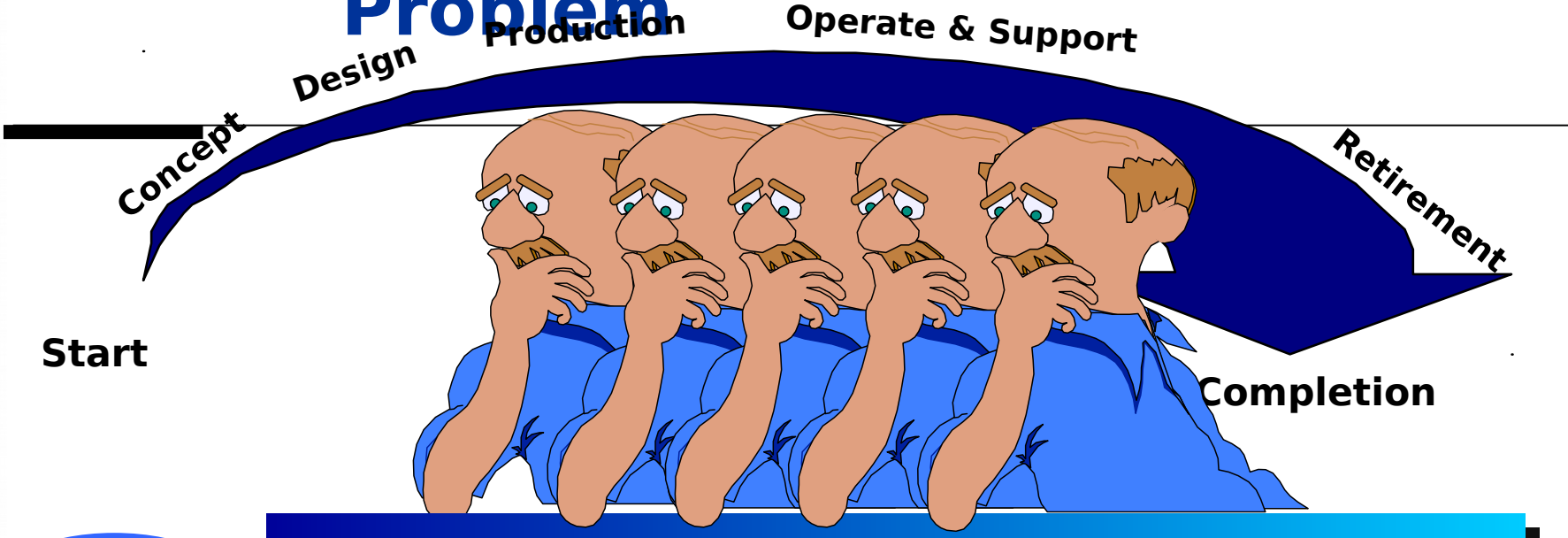
- Identify Risks
- Classify Risks
- Estimate the likelihood and Consequence of Occurrence
- Determine Impact
- Determine Timeframe for mitigation action to oc

- Identify best handling approach:
  - Assume
  - Avoid
  - Control
  - Transfer
- Triggers
- Develop Contingency Plans

- Iterative Process
- Top Ten Risk Items
- Watch list
- Lessons Learned



The Generic Problem



Data

History | Current Experience | Hindsight

Information

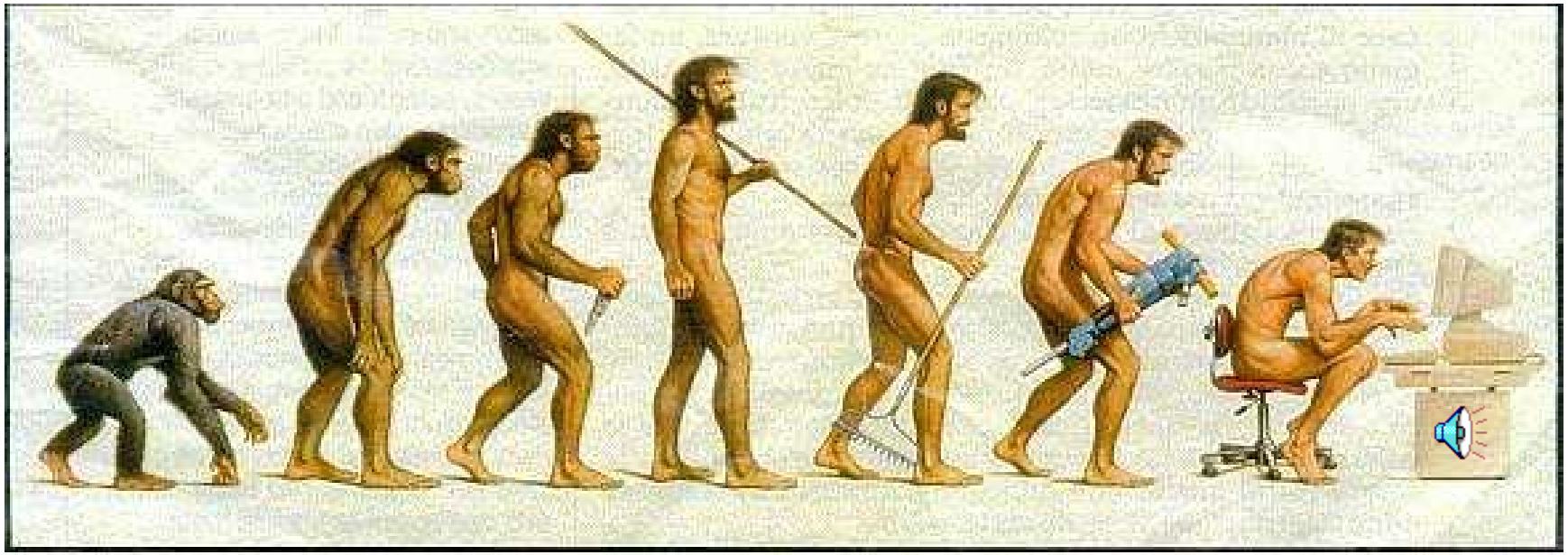
General Uncertainty | Specific Uncertainty | Total Certainty

Risk

Unknown Unknowns | Known Unknowns | Knowns

KEY RECOMMENDATION: Preserve Useful Conscious Time

- Leverage technology; don't be its slave
- **Disciplined** communication
  - **Filter and Highlight, not amplify and retransmit**
  - **UVINJ**



Somewhere, something went terribly wrong

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Create the Vision

- Integrated Program/Product Teams
  - **Recognize and be prepared to deal with cultural differences**
  - **Actively work to build the team**
- Clarify:
  - **Risk Management Process**
  - **Organizational Relationships**
  - **Decision-making**

Create ownership of the process within the TEAM

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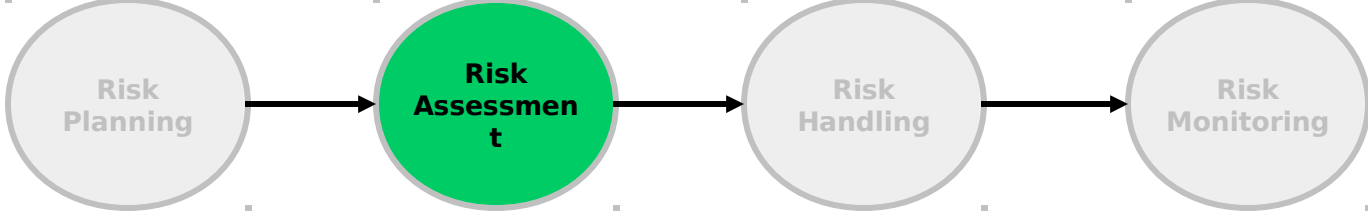

Methodology

- Identification – What might or might not happen?
  - **Consider:**
    - Periodic Risk Review Meetings
    - Benchmark other programs
    - Lessons Learned
    - Interviews
    - Best Judgment
    - Processes Lacking Rigor
    - Changing Requirements
    - Defining an Unknown

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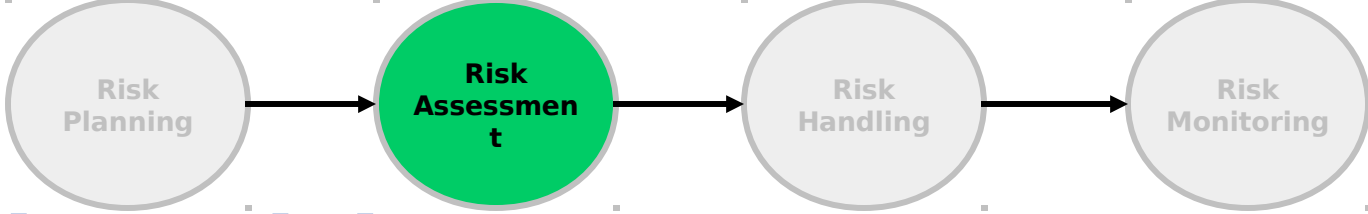

Identifying Risk

- Ignorance is not bliss
  - **Structured and unstructured methods**
  - **Templates, benchmarking, nominal group, brainstorming, MBWA**
- Open (but disciplined) communication
  - **Never shoot the messenger**
  - **Include the functional organization**
  - **Who should know? Who can help?**
- Empower the team
  - **Responsibility, accountability, authority**
  - **“Filter and highlight”, not “amplify and retransmit”**
  - **Preserve useful conscious time**
- Graybeards/Grayheads, Black Belts
- Independent assessment teams

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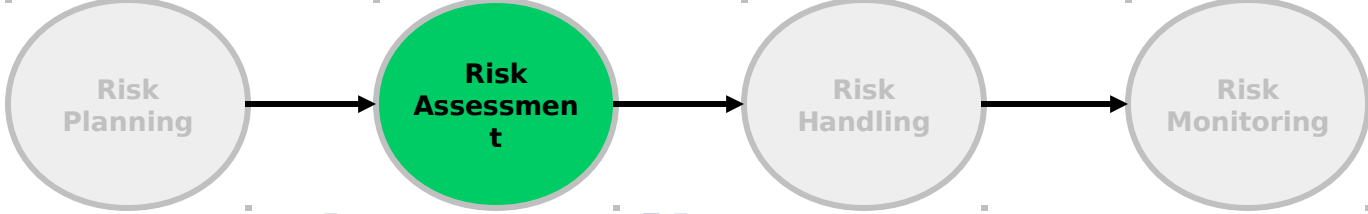
Where to look for risk?

You Need to Look Everywhere

- Put the process in place
- Make sure it’s working
- Keep the big picture in focus, but…
- …pay attention to the details
- Be a “forcing function”



Methodology (cont'd)

- Analysis
  - **Risk Classification**
    - Cost, Schedule, Programmatic, Support, Technical Performance
    - Internal or external
  - **Risk Consequence (Severity)**
    - Minimal Impact, Marginal, Significant, Critical, Unacceptable
    - Rate 1 through 5
  - **Probability of Occurrence**
    - Remote, Unlikely, Likely, Highly Likely, Near Certainty
    - Rate 1 through 5
  - **Nominal Risk Classification**
    - Low, Moderate, High
  - **Time Horizon**
    - When will this happen
    - When do we need to act to

Classification Schemes
- Nominal - Low, Med, Hi
- Ordinal - Ordered list
- Cardinal - Numeric Value

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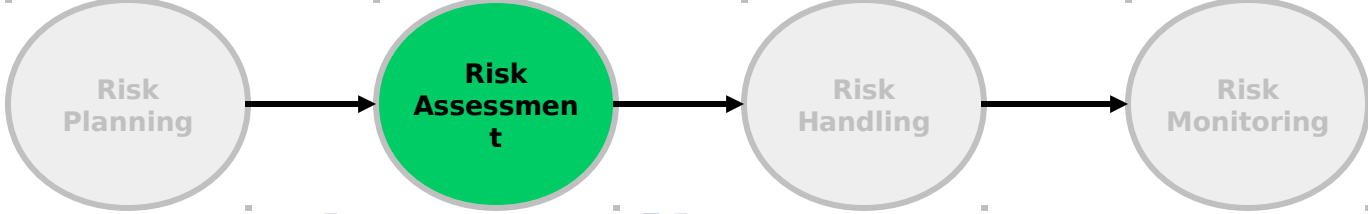


Methodology (cont'd)

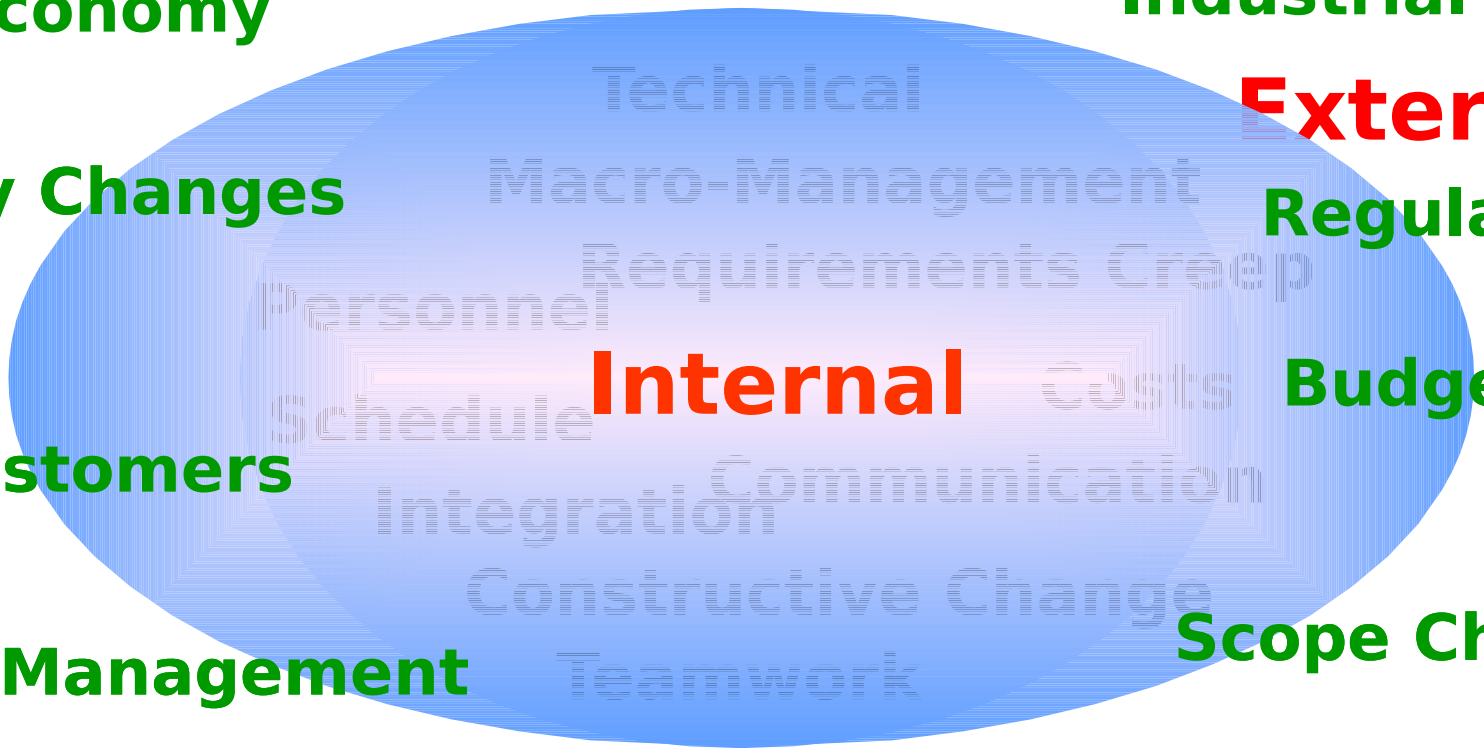
Risk Classification

Cost	Risks associated with cost growth or funding instability
Schedule	Risks associated with schedule slippage
Programmatic	Risks associated with changes in regulations, environmental impacts, or program office resources (funding & personnel)
Support	Risks associated with training, fielding, maintenance and support of the system
Technical performance	Risks associated with meeting performance specifications

- **Internal** – A risk that the program office has direct control over and mitigation is possible
- **External** – A risk that the program office may or may not be able to influence, but still needs to keep a close eye on. May not mitigate risk but need to develop contingency plans

Seek to CONTROL the Internal & INFLUENCE the External

Sources of Risk



Analyze Risk

- When might the event occur?
  - **What should we look for? How will we know?**
  - **When do we need to act to avoid or mitigate?**
  - **What might happen as a result?**
- How likely is it?
- What is the impact? Is it positive or negative?
  - **How do you quantify "impact" when cost, schedule and performance are all related?**
  - **If all uncertainty was bad, no one would ever buy a lottery tic**
  - **Try to identify EVERY possible outcome.**
- What can we control or influence?
  - **The probability of the event itself?**
  - **The probability of possible outcomes?**
  - **The impact of each possible outcome?**

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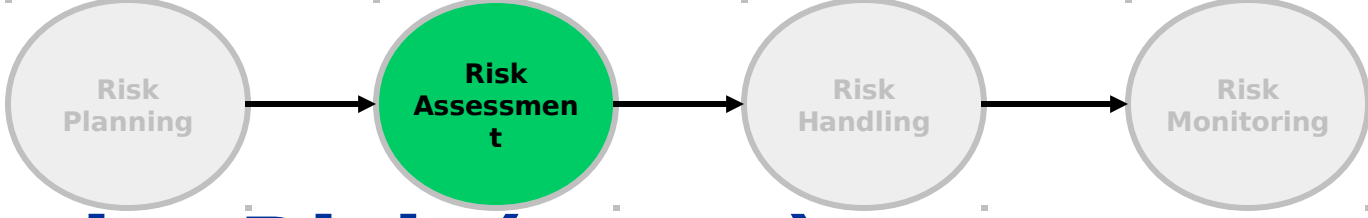
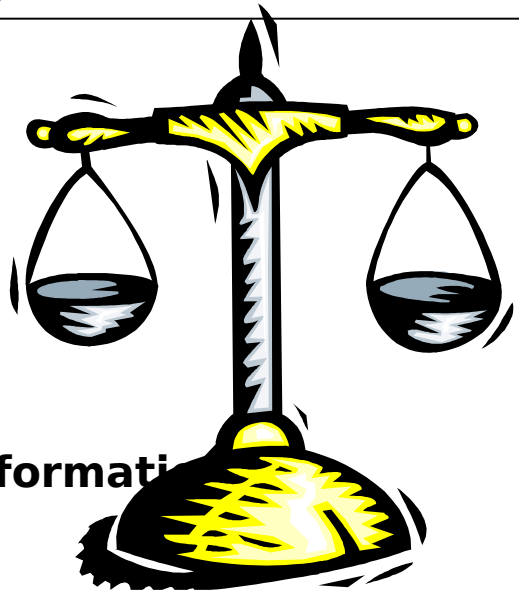


Analyze the Risk (cont.)



- "Expected Value" vs "Value you Expect"
  - **Keeps Las Vegas & Lotteries in business**
  - **Decision and Probability Trees**
- Is the impact worth the cost of analysis?
  - **Reasonable Range vs Point of Indifference**
  - **Understand the "Expected Value of Perfect Informati**
  - **ROM vs Budgetary vs Detail estimates**
- Look for a root cause. Where's the leverage?
  - **Look upstream**
  - **3 "What's" and 5 "Why's"**
  - **Influence Diagrams, Fishbone Diagrams**

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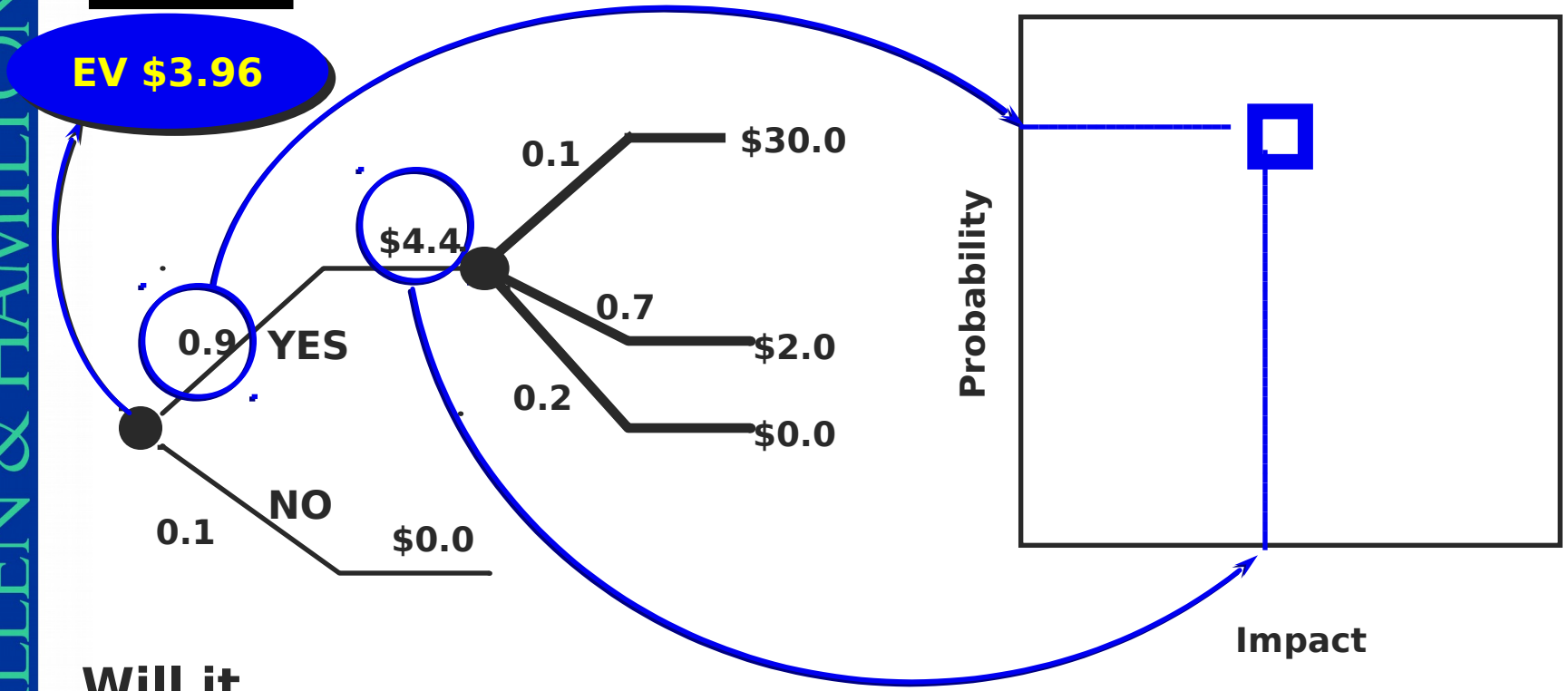
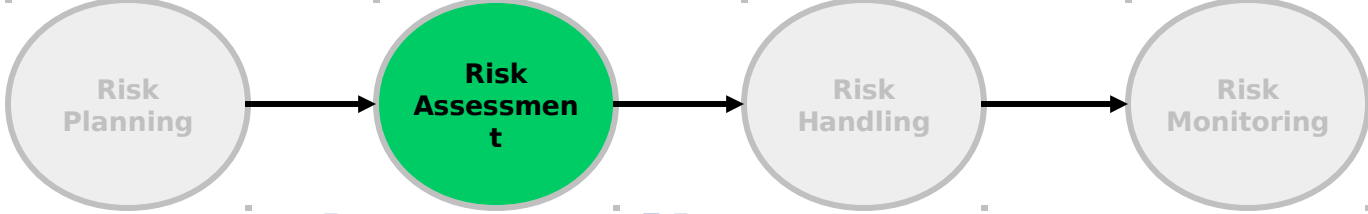
Relationship between Expected Value and Risk Matrix



If the risk event occurs, what happens next?



Methodology (cont'd)

Risk Severity of Consequence

Level		Cost	Schedule	Technical	Program-matic	Support
Minimal Impact	1	Minimal deviation from planned budget	Minimal schedule impact	Similar system in field currently meets all requirements	Issues that have minimal impact	Similar system currently being supported with established logistics system
Marginal	2	<10% Deviation from planned budget	Meet schedule with additional project resources or additional activities	Meets objective requirement but margin is low	Issues that can be mitigated by Program office	Support plan not fully resourced, but adequate to meet both IOC and FOC
Significant	3	10 – 15 % Deviation from planned budget	Slip less than 4 months in key milestones	Meets threshold with adequate margin	Issues that may require PEO support	Support plan not fully resourced, but adequate to meet IOC
Critical	4	15 – 20 % Deviation from planned budget	Major slip (over 4 months) in key milestones	Meets threshold with low to no margin	Issues that may require SAE support	Support requirement not fully funded but marginally executable
Unacceptable	5	> 20% Deviation from planned budget	Cannot meet APB milestone or key program milestone	Does not meet threshold	Issues that may require DoD support	Support requirement exceeds resource capabilities

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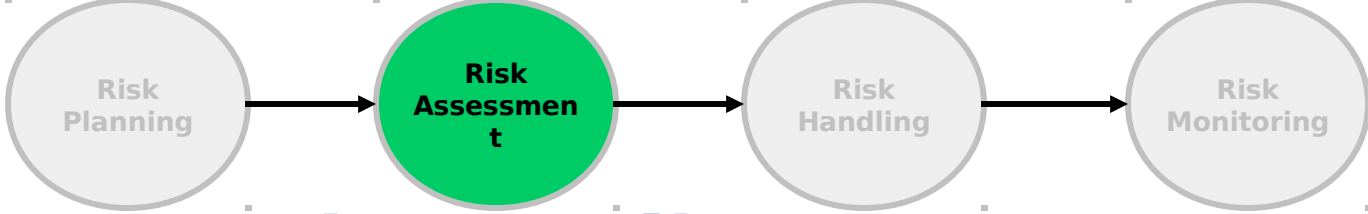


Methodology (cont'd)

Risk Probability of Occurrence

- **What is the likelihood the risk will happen?**

Level			Normal approaches and processes…
Remote	**Very Low (<10%)**	**1**	…Will effectively avoid or mitigate this risk based on standard practices
Unlikely	**Low (11 -35%)**	**2**	…Have usually mitigated this type of risk with minimal oversight in similar cases
Likely	**Medium (36%-65%)**	**3**	…May mitigate this risk, but workarounds will be required
Highly Likely	**High (66%-90%)**	**4**	…Cannot mitigate this risk, but a different approach might
Near Certainty	**Very High >90%)**	**5**	…Cannot mitigate this type of risk, no known processes or workarounds are available

Table 1 Assessing Risk Probability

What Is The Likelihood The Risk Will Happen?		
Level		**Normal Approach and processes...**
1	Very Low (<10%)	...Will effectively avoid or mitigate this risk based on standard practices
2	Low (10% - 35	...Have usually mitigated this type of risk with minimal oversight in similar cases
3	Medium (36%-65%)	...May mitigate this risk, but workarounds will be required
4	High 66% - 90%	...Cannot mitigate this risk, but a different approach might
5	Very High (>90%)	...Cannot mitigate this type of risk; no known processes or workarounds are available

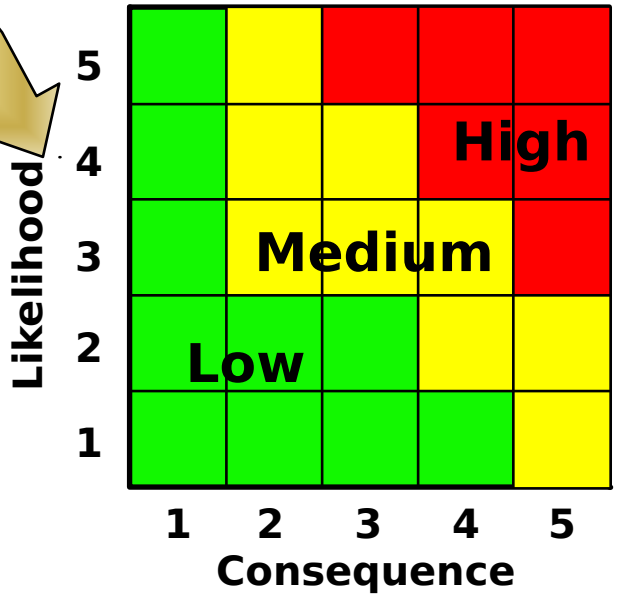


Table 2 Assessing Risk Impact

If The Risk Event Occurs, What Will Be The Impact?			
Level	**Technical**	**Schedule**	**Cost**
1	Minimal or no impact	Minimal or no impact	Minimal or no impact
2	Meets Objective Requirement, but margin is low.	Additional activities needed to meet key dates	Development cost or UPC increase <1%
3	Meets threshold, but not objective requirement	Milestone 2ithin 2 months of DAES threshold or key need date	Development cost or UPC increase <5%
4	Fails to achieve threshold requirement, Alternatives exist that meet threshold	DAES schedule breach or key need date missed. Schedule acceleration IS possible	Development cost or UPC increase <10%
5	Unacceptable outcome with no known alternative	DAES breach or key need date will be missed. Schedule acceleration NOT possible.	Development cost or UPC increase >10% or "above threshold reprogramming" is required

Questions about Risk Management?

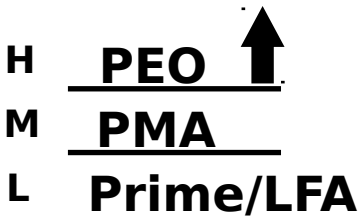
Call a member of the Risk Mgmt Team

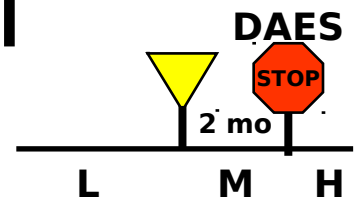
Name Phone

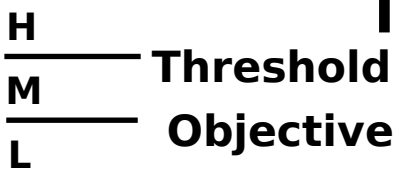
_____ (___)___-_____
_____ (___)___-_____
_____ (___)___-_____
_____ (___)___-_____
_____ (___)___-_____
_____ (___)___-_____

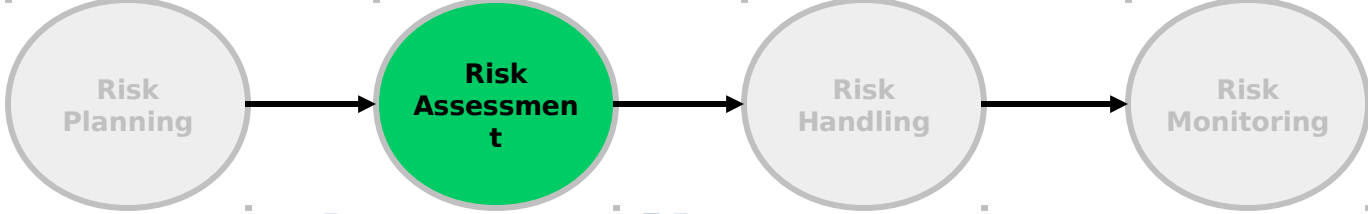
Comparing Apples to Oranges Example

	COST		SCHEDULE	PERFORMANCE	Norm COST
HI	Requires above-threshold reprogramming $4M < Cost	Exceeds Component LCC by> $15%	Breaches DAES Milestone or delay > 4 mo.	Fails to meet threshold	Over $4M
MED	Less than BTR, but Contractor/LFA can not absorb. $100 < cost < $4m	Exceeds Component LCC by >$5M % < $15%	Slides DAES milestone to within 2 months of breach, or schedule slip over 1 month	Meets threshold but not objective	$4M - $100 K
LOW	Contractor or LFA can absorb cost < 100K	Exceeds Component LCC by <$5%	Slides less than 4 weeks	Degrades performance, but meets both threshold and objective	$100 K or Less









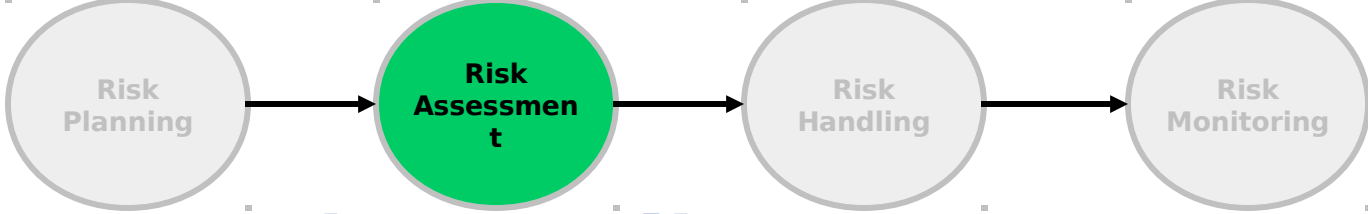
Methodology (cont'd)

- **Risk Rating - A measure of how serious the effect on the project will be if the risk materializes**

Probability of Occurrence						
5	Near Certainty	5	10	15	20	25
4	Highly Likely	4	8	12	16	20
3	Likely	3	6	9	12	15
2	Unlikely	2	4	6	8	10
1	Remote	1	2	3	4	5
		Minimal or no Impact	Marginal	Signifi-cant	Critical	Unaccept-able
		1	2	3	4	5

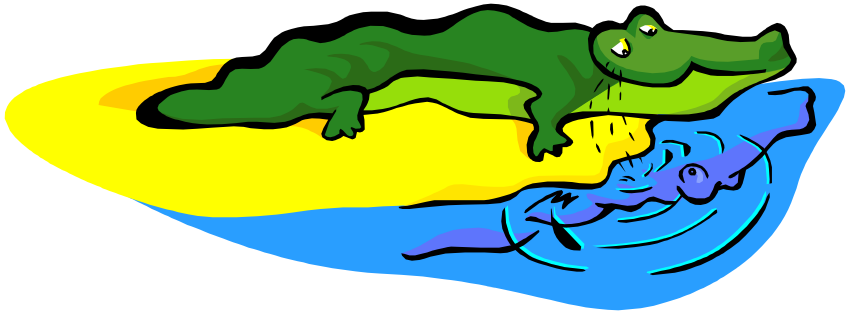
Severity of Consequence

- **High –** Unacceptable. Major disruption likely. Priority management attention required
- **Moderate –** Some disruption. Additional management attention required
- **Low –** Minimal impact – Normal oversight needed to ensure risk remains low

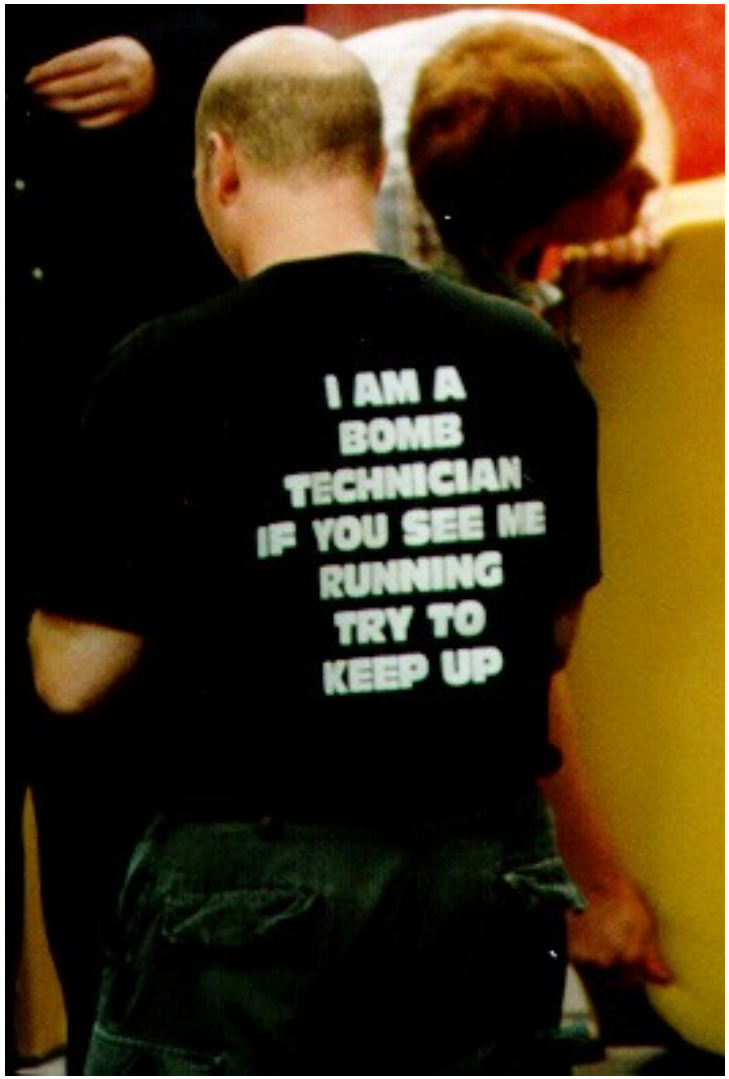


Methodology (cont'd)

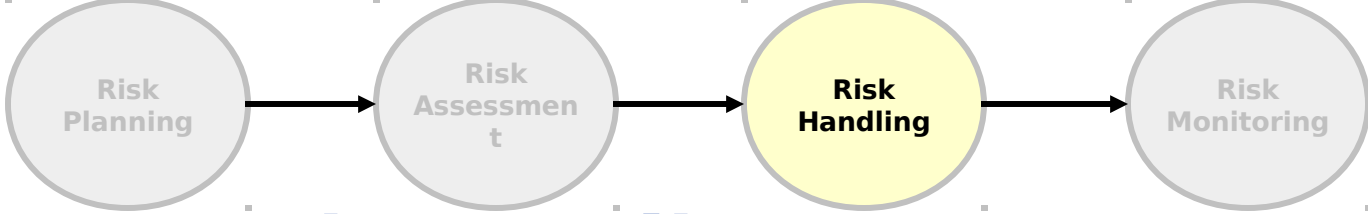
- Risk Time Horizon
  - **Imminent – within 6 months**
  - **Near – within 1 year**
  - **Mid – within 1 to 2 years**
  - **Far – 2 to 5 years**
  - **Very Far – beyond 5 years**
- Indicates Schedule For
  - **Mitigation Actions**
  - **Contingency Plan**



General Strategies for Handling Risk



- Assume
  - **Self-insure; willing to accept the consequences**
- Transfer
  - **Can someone else assume it?**
  - **Is there an acceptable interim solution?**
- Control
  - **Probability of the risk event?**
  - **Probability of possible outcomes?**
  - **Consequence of possible outcomes?**
- Avoidance
  - **Alternate approach**
  - **Parallel path**
    - Cost, Neckdown strategy, Contract Implications?
- **Follow the man on the left!**



Methodology (cont'd)

- Risk Handling
  - **Mitigation Strategies**
    - Assumption
      - Typically used for risks assessed as low impact
      - May require no action
      - Since mitigating every risk is cost prohibitive, assume a certain degree of risk
      - Project office willing to accept consequences of risks
    - Transfer
      - Sharing all or part of the risk with others
      - Attempt to re-distribute risk to external sources (i.e., type of contract, performance incentives, warranties, etc…)

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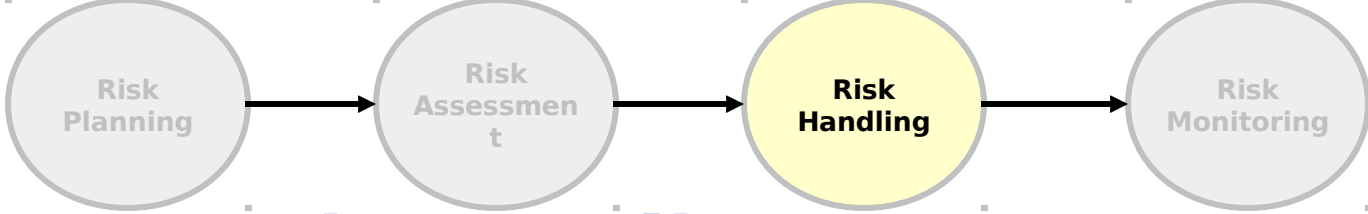
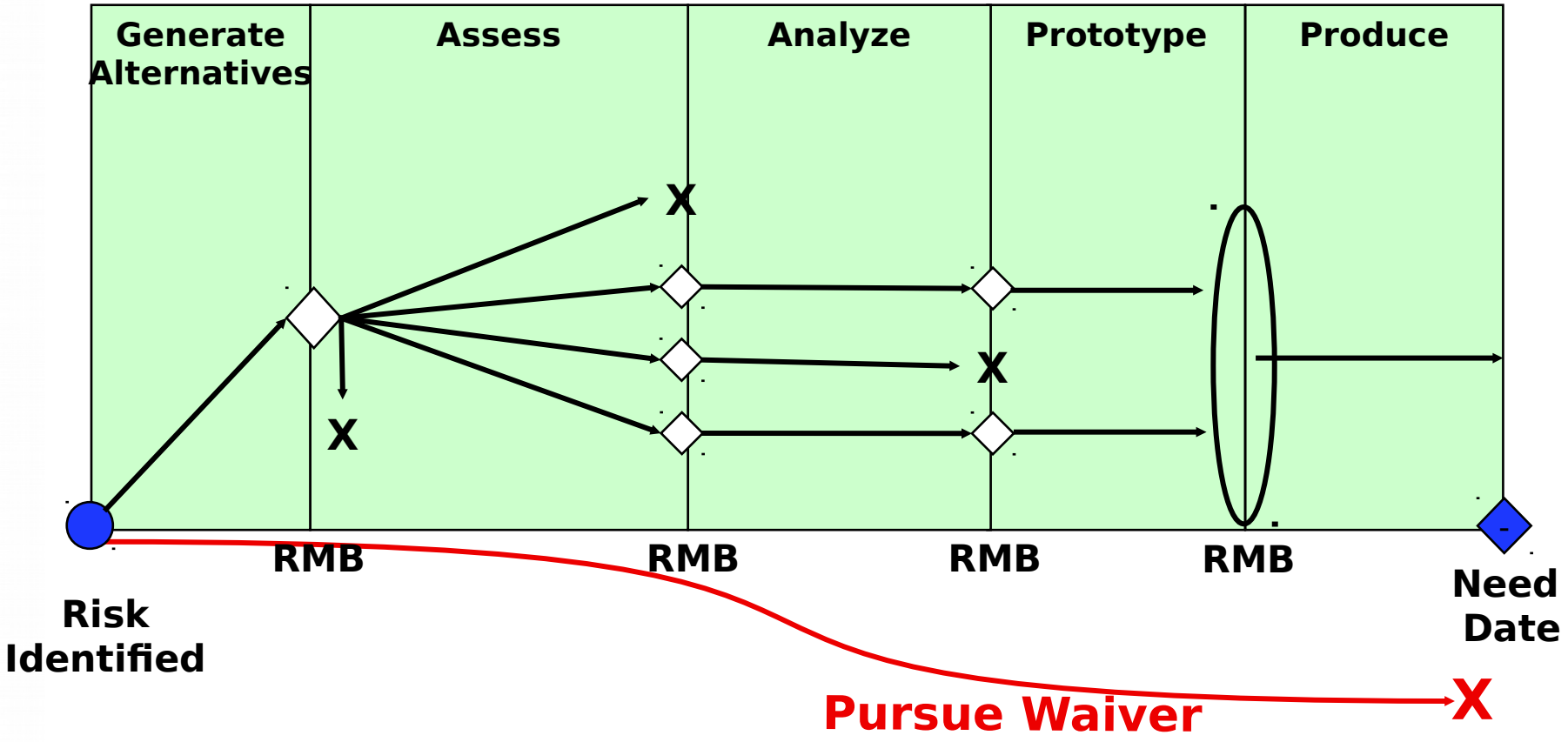
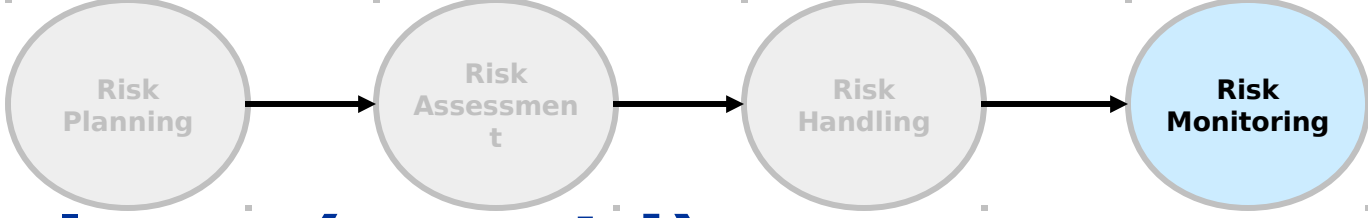


Methodology (cont'd)

- Risk Handling
  - **Mitigation Strategies (cont'd)**
    - Control
      - Often used for moderate risks
      - Mitigate by attacking controllable factors
        - Reduce likelihood of occurrence, improve likelihood of favorable outcomes
      - Identify triggers:
        - What do we look for? =>Early warning indicators
        - Dates and deadlines: Need dates, **action** dates for contingency plans
        - Get Help!
    - Avoidance
      - Often used for high risks
      - Requires action to eliminate or reduce risk
      - Execute mitigation actions to improve the risk impact, probability, or timeframe
  - **Contingency Plan**
    - In case the risk event occurs: ***ALWAYS*** have a viable alternative

Mitigation Strategy
(Always have an option)





Methodology (cont'd)

- Risk Monitoring
  - **Matrix Chart for briefs (keep them on file!)**
  - **"Top Ten" List**
    - Prioritize Risks
      - Risk Rating [H, M, L]
      - Scale [25, 20,…1]
      - Classification [Technical, Schedule, Cost, Support, Programmatic]
    - Nominal, Ordinal, Cardinal Rankings
    - Metrics
      - **Metrics motivate behavior… what are you encouraging?**
  - **Watch list**
    - Ensure moderate and low risks do not escalate to higher risk levels
    - Dynamic list and will change as the project progresses

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Summary

- Always have an alternative that works
- Be ready to handle crises
- Increase the probability of acceptable outcomes
- Reduce the impact of less desirable outcomes
- Decrease the probability of the risk event itself
- Identify parallel paths, lead time, decision points, and action plans
- Have a clear management path for resolving issues and communicating results
- Risk can be opportunity (look for the pony)

Booz Allen is one of the World's Largest and Most Widely Respected International Management and Technology Firms

- Global Management and Technology Consulting
  - **Combines industry and government experience and comprehensive technology and management skills to focus on client issues**
- Serves Commercial, Government, and Institutional Clients
  - **Fortune 500 Companies**
  - **Major Departments of the U.S. Government**
  - **All Joint Warfighters**
- $2 Billion in sales (FY ended 3/31/01)

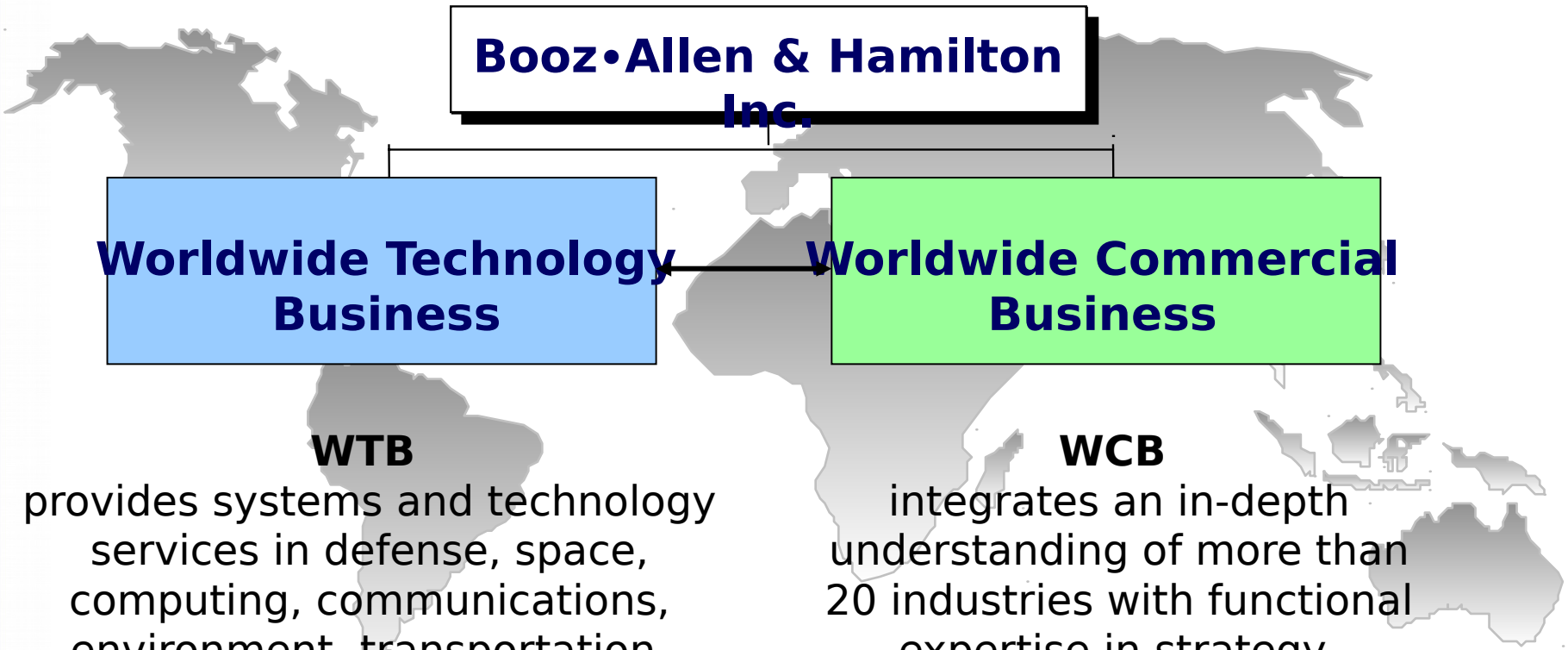
Founded in 1914

Private corporation

10,000+ staff

Offices Worldwide

Booz Allen & Hamilton
Business Sectors



WTB
provides systems and technology services in defense, space, computing, communications, environment, transportation, health care, and management services

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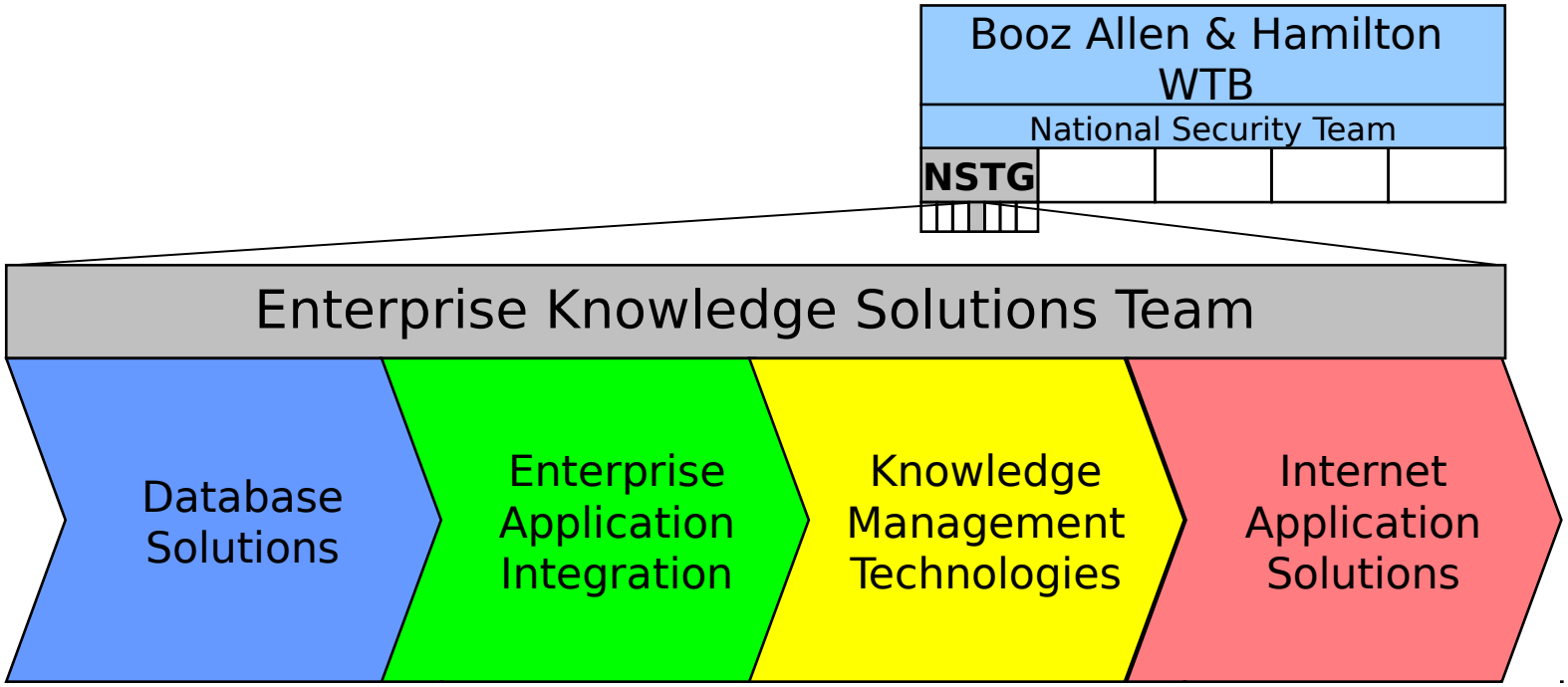
integrates an in-depth understanding of more than 20 industries with functional expertise in strategy, operations, systems, and technology

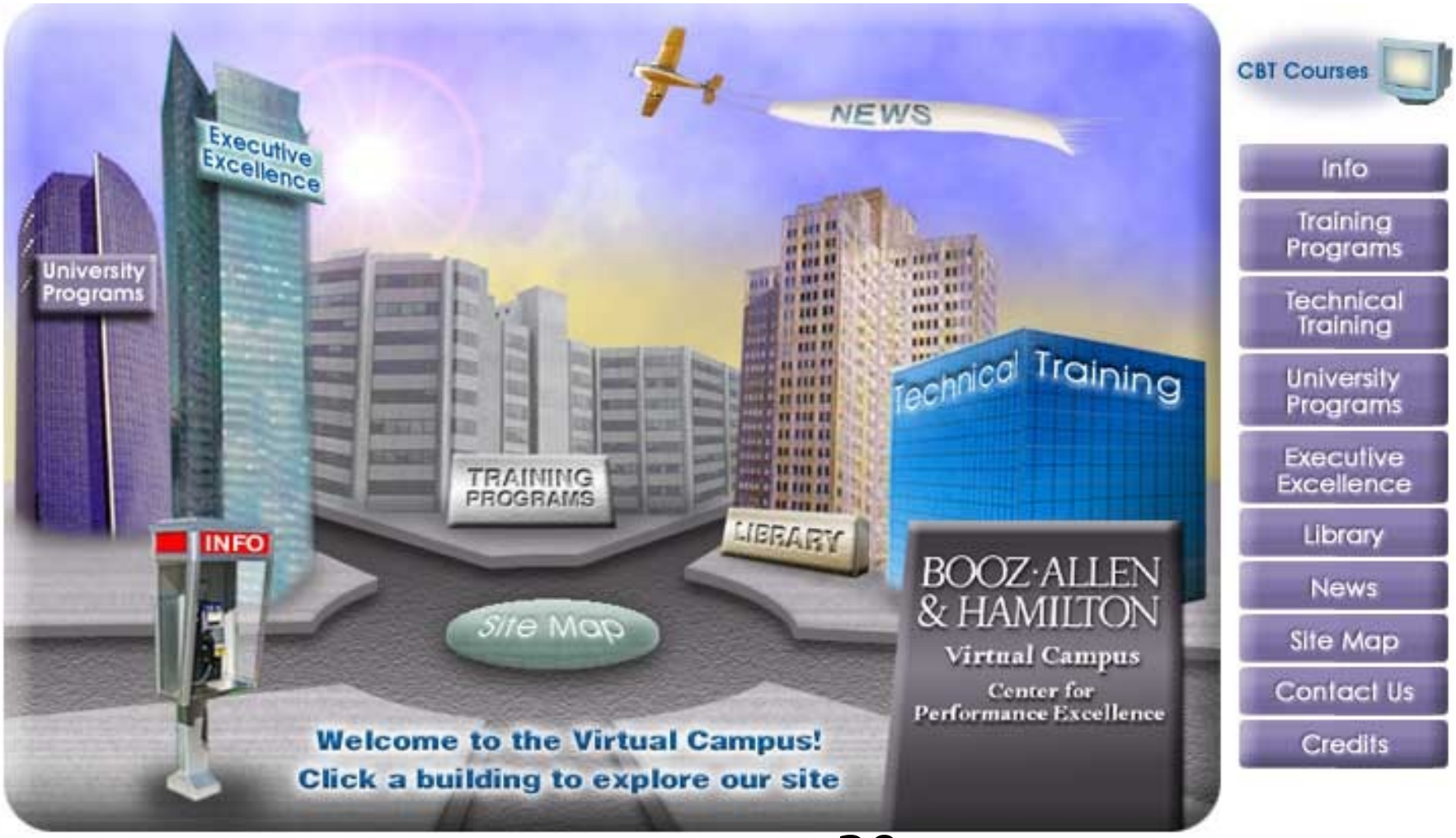
WTB and WCB Share Best Practices

National Security Technology Group
Enterprise Knowledge Solutions Team

Mission: To provide end-to-end implementation and knowledge management solutions to our clients utilizing state-of-the-art methodologies, technologies, products, and services.



Booz Allen Encourages Continuing Education

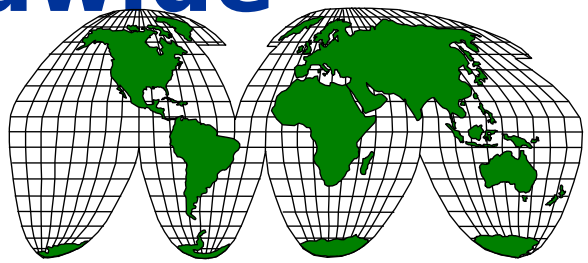


Technology Demonstration Room

- Technology Focus Groups
- Vendor Presentations/Tool Demonstrations
- Real-time participation/Video archive

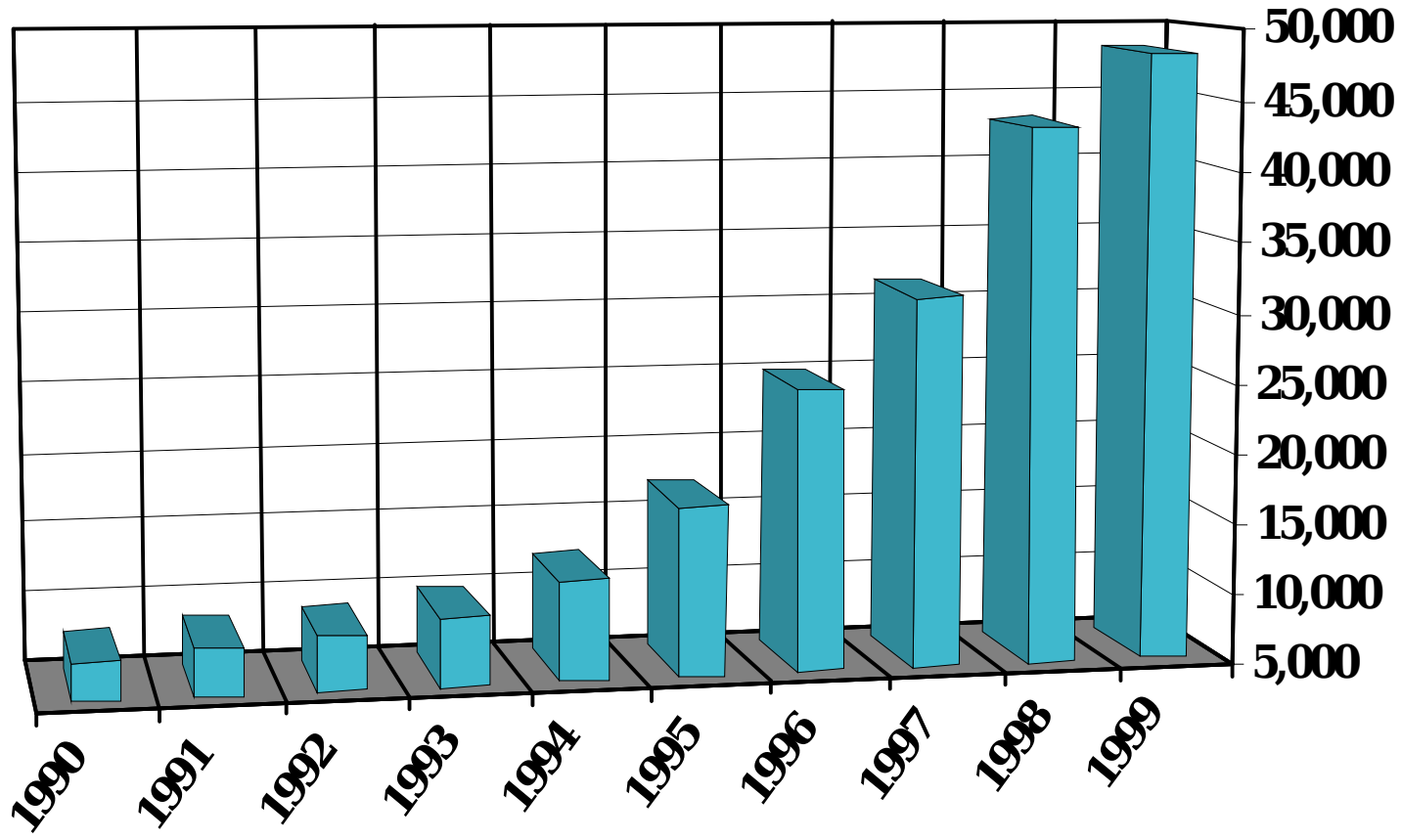
SRC Systems Lab

PMI Worldwide

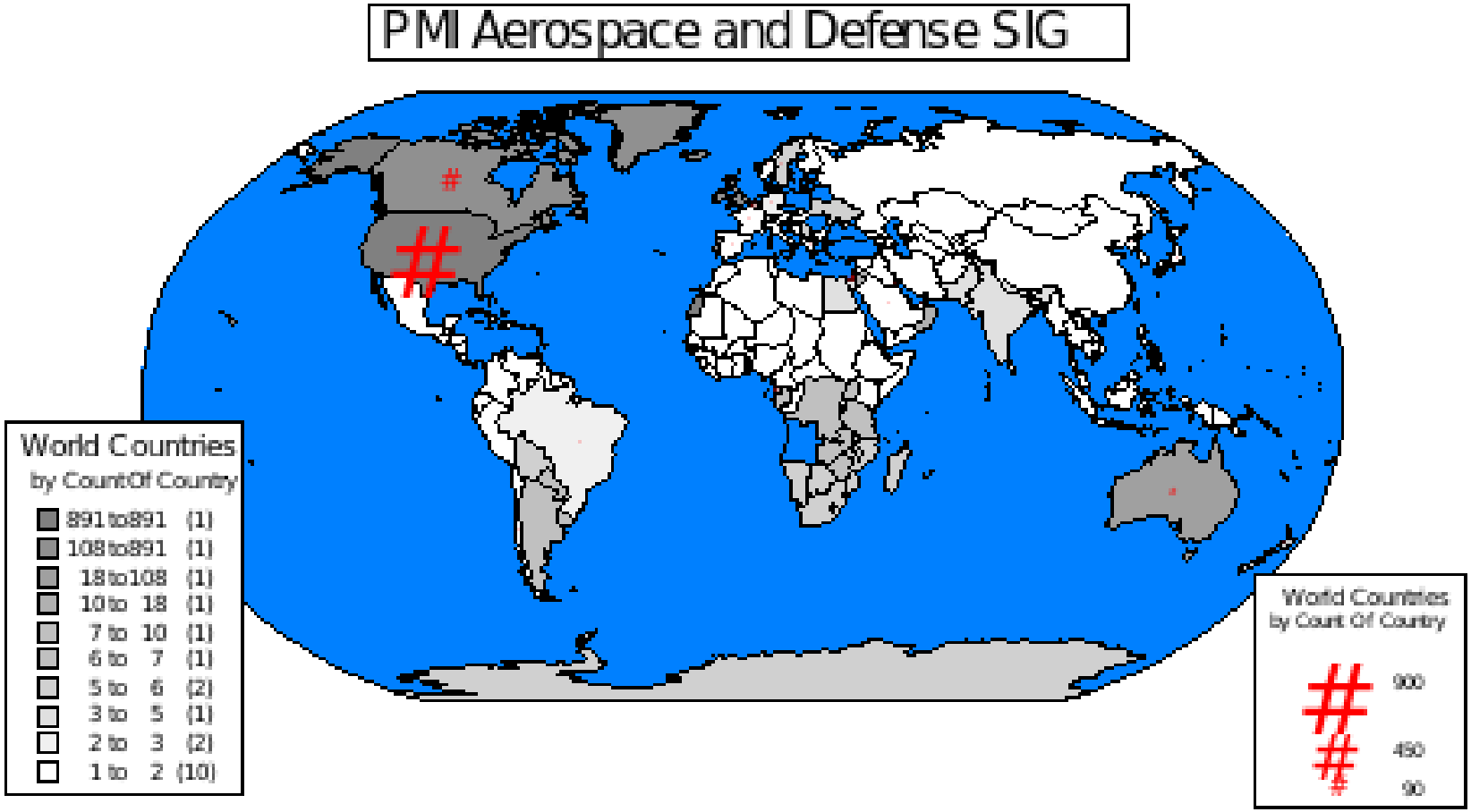


- Nearly 50,000 members in over 100 countries
- Nearly 350 organizations participating in the Corporate Program
- Almost 150 chartered chapters and nearly 50 potential chapters
- 20 chartered SIGs and 5 potential SIGs
- 1 College

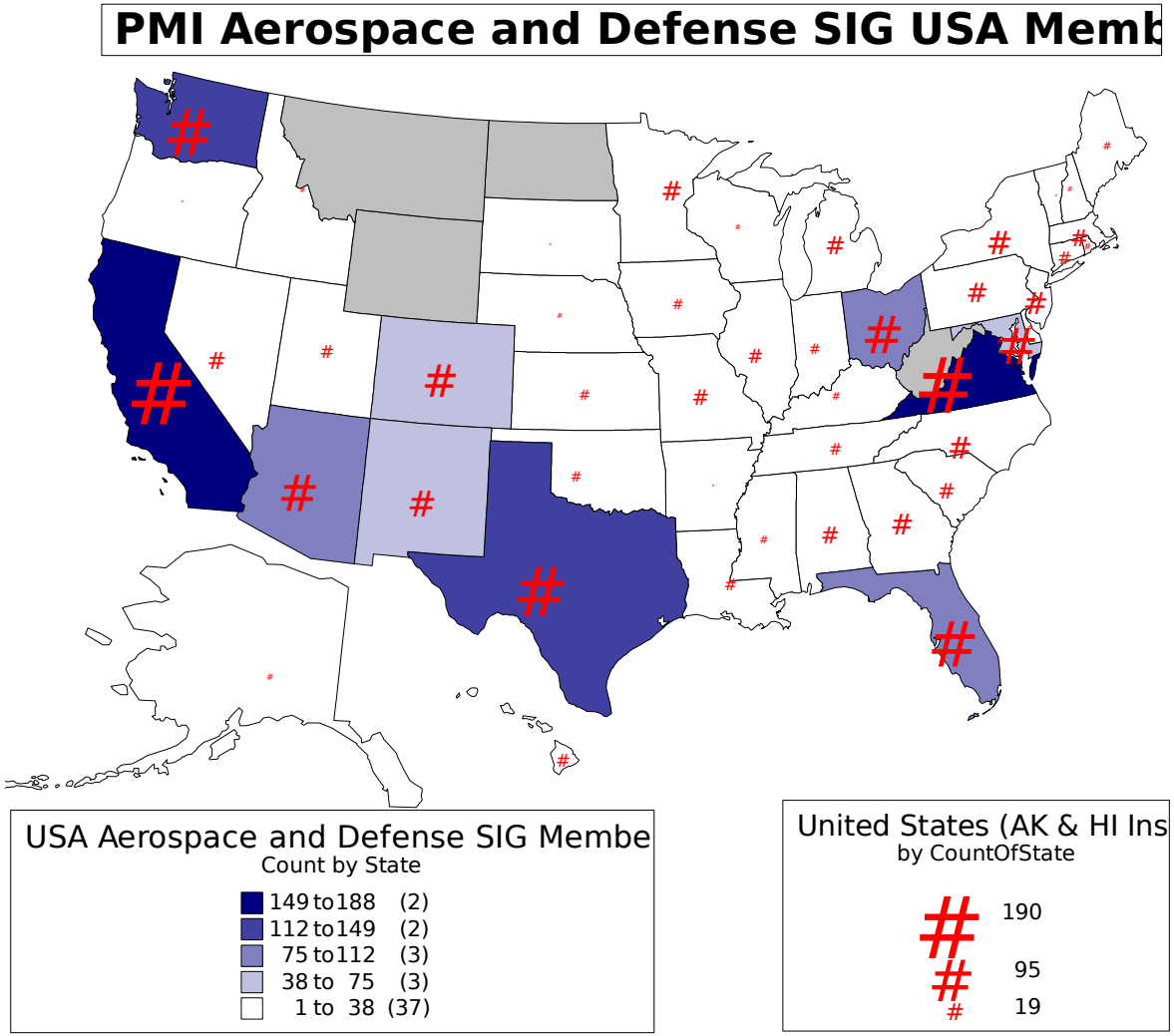
PMI Membership Growth



PMI Aerospace and Defense SIG
Global Membership

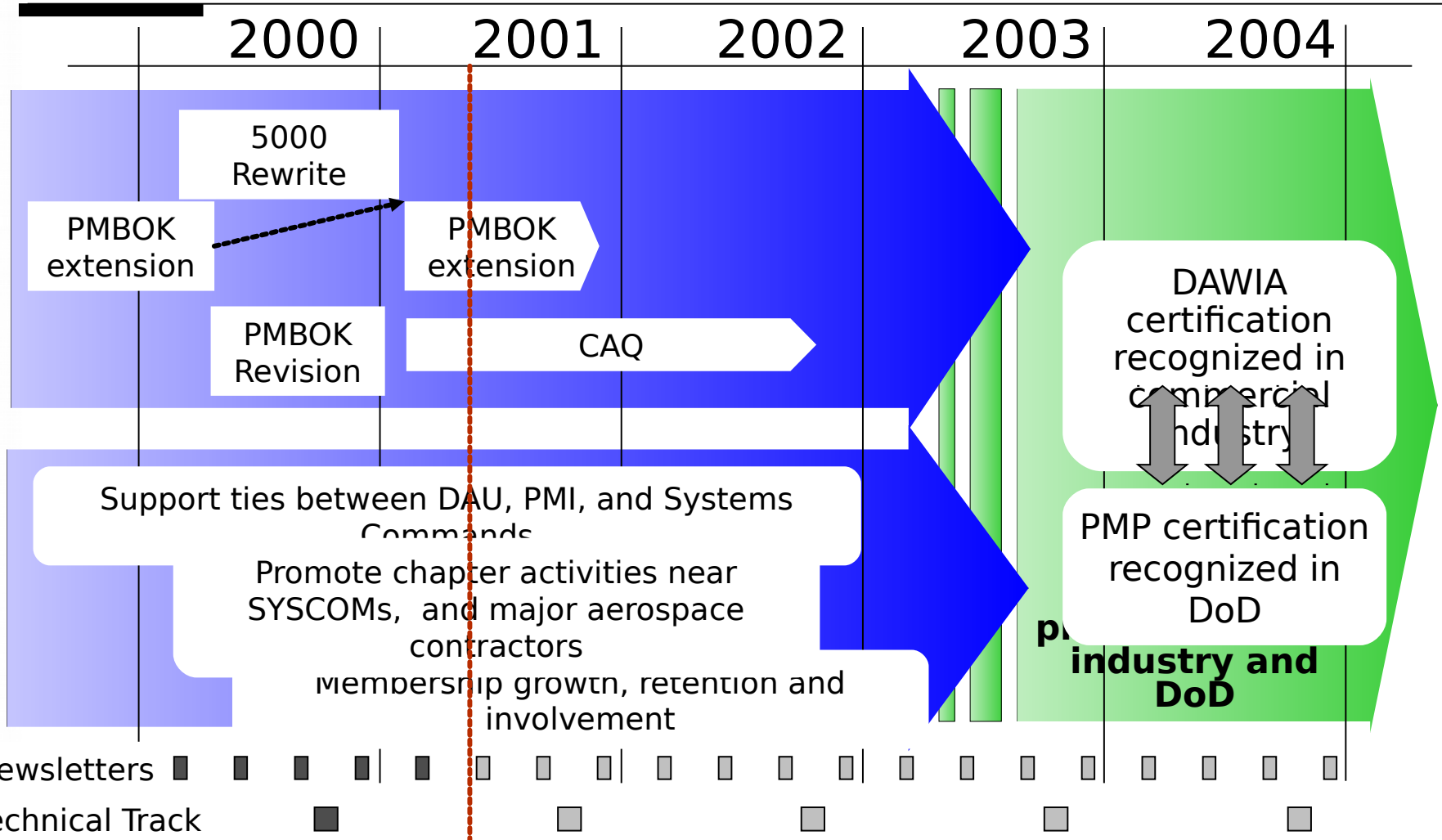


PMI Aerospace and Defense SIG
US Membership



Aerospace & Defense SIG

5 Year Goals



PMI Aerospace and Defense SIG

Membership Growth

Questions?

BOOZ·ALLEN & HAMILTON

Managing Risk

Executive Program Manager's Course

Defense Systems Management College

May 11, 2001

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